

CLAIMS

1. Photoelectric detection device comprising a matrix of elementary detectors on an insulating substrate (1), each of the said elementary detectors
5 comprising a stack consisting of a lower electrode (2), a layer of a photosensitive material (3) and a phototransparent upper electrode (4), the said upper electrode being common to all the elementary detectors, each of the lower electrodes (2) being connected
10 independently of one another to a sense circuit, characterized:

- in that the lower electrodes (2) are each positioned on an individualized insulating zone (6) which is elevated with respect to the insulating substrate (1);
15 - and in that the upper electrode (4) is not flat and is furthermore inserted between two adjacent zones (6) until it reaches a level below that of the lower electrodes.

2. Photoelectric detection device according to
20 Claim 1, characterized in that the insulating substrate (1) consists of a layer of insulating material deposited on a signal processing circuit.

3. Photoelectric detection device according to one of Claims 1 and 2, characterized in that the zones (6)
25 each consist of an individualized additional insulating layer deposited on the insulating substrate (1).

4. Photoelectric detection device according to one of Claims 1 and 2, characterized in that the zones (6) form an integral part of the insulating substrate (1).

30 5. Photoelectric detection device according to one of Claims 1 to 4, characterized in that the zones (6) have a raised shape, so that the photosensitive detection layers (3) of two adjacent pixels face one another substantially vertically at the pixel edge,
35 with strictly opposite polarities.

6. Photoelectric detection device according to one of Claims 1 to 5, characterized in that the photoelectric detectors are composed of PIN, NIP, PI, NI, IP or IN diodes.

7. Photoelectric detection device according to one of Claims 1 to 5, characterized in that the photosensitive material (3) is based on silicon.

8. Photoelectric detection device according to one of Claims 1 to 5, characterized in that the photosensitive material (3) is based on silicon alloyed with hydrogen, germanium or carbon.

9. Method for the production of a detection circuit consisting of a matrix of elementary detectors deposited on an insulating substrate (1) and associated with a sense circuit, characterized in that it consists:

- in producing a metallization layer (9) for each of the elementary detectors, which is connected to the sense circuit by means of conductors passing through the insulating substrate;

- in depositing a layer of an electrically insulating material (6) constituting a zone on the insulating substrate, so as to enclose the said metallization layer (9);

- in producing a hole in the said layer (6) until it reaches the metallization layer (9), and in filling the hole produced in this way with an electrically conductive material (8) which therefore comes into electrical contact with the said metallization layer (9);

- in depositing an electrode (2) intended to become a lower electrode on the upper surface of the insulating layer (6), the said electrode being in electrical contact with the electrical conductor (8);

- in depositing a layer of photosensitive material (3) on all of the matrix produced in this way, which substantially follows the shape of each of the elementary assemblies consisting of the insulating layer and the lower electrode;

- in depositing a single phototransparent upper electrode (4) on the stack produced in this way, which in turn also follows the shape of the insulating zones (6), so that it descends to a level below the level of the lower electrodes in the inter-detector regions (5) formed in this way.

10. Method for the production of a detection circuit consisting of a matrix of elementary detectors deposited on an insulating substrate (1) and associated with a sense circuit, characterized in that it consists:

- in depositing a conductive metal layer and in connecting it to the sense circuit by means of a conductor;

- in carrying out lithography and etching of this metal layer, so as to produce individualized lower electrodes;

- in carrying out deep etching within the insulating substrate;

- then in depositing a photosensitive layer, including where the insulating substrate has been etched, so that the photosensitive layer follows the particular profile produced in this way;

- and lastly in depositing a single phototransparent upper electrode, including where the insulating substrate has been etched, so that the said upper electrode is inserted into the inter-pixel space in order that it descend to a level below that of the lower electrode.